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Accordingly, and in response to these discoveries, proposed by the present invention is a special ventilation, or coolant, fluid-flow management system and methodology which effectively eliminate these discovered exhaust-grit problems.

Further elaborating, in the operating environment of an aircraft, and with the present invention installed and operating, when the engine is running, and the aircraft is flying, an air intake collects an inflow of air and feeds it into the intake end of a fluid conduit system, the discharge end of which (or ends if more than one electrical generator is/are involved) is/are tightly coupled to (via a fluid-flow connection which, as shown in Fig. 2 of the drawings herein, closes upon) the electrical sliding-contact (brush, etc.) zone(s) in the generator(s). Intermediate the intake and discharge ends of the conduit system, in accordance with the invention, is a filter, or a filter structure, which blocks the passage of harmful grit, such as exhaust grit, which may be present in this air flow.
Additionally, upstream from this filter structure is an air-flow expansion chamber which acts to retard air-flow velocity, and to expand the cross-sectional area of this retarded flow, thus to improve filtering action. Adjacent the base of the filter structure is a gravity-functioning trap and drain which collects and discharges moisture in the fluid flow adjacent the filter structure.

Installation and operation of this system of the invention effectively eliminates the catastrophic wear and failure problem to which the invention is addressed.

_____These and other important features and advantages which are offered by the structure and methodology of the present invention will become more fully apparent now as the description which shortly follows is read in conjunction with the accompanying drawings.

22a, respectively in generators 20, 22. Zones 20a, 22a are shown as shaded regions in Fig. 2. Connectors 38, 40 may be of any suitable design appropriate to the configurations of the generators, and do not form part of the present invention. In the absence of connectors 38, 40 [[,]] which closes upon zones 20a, 22a, these zones, undesirably, would ~~are considered to~~ be nominally exposed to otherwise uncontrolled , un-grit-filtered airflow. Closure of connections 38, 40 on zones 20a, 22a, respectively, in addition to being discussed herein is illustrated graphically at the right side of Fig. 2.

Disposed within structure 28, just above trap and drain structure 30, which drains liquid to the outside of aircraft 12 as indicated by arrow 42, is a filter, or filter structure, 44. This filter is preferably structured to block the passage into conduit section 32 of substantially all particles. The specific structure of the filter is conventional, and is not part of the present invention. A filter structure which has been found to work well in the specific aircraft mentioned above is a foam filter made by Brackett Aero Filters, Inc., of Kingman, AZ, Model No. BA-5110.

With this arrangement as just described, substantially all ventilating airflow which is provided to zones 20a, 22a is delivered by system 18, and through filter 44, and is then close-coupled to these zones through connections 38, 40.

Freely choosable by one implementing the present invention is the specific location for filter 44. Cleaning and/or replacing of a filter is accommodated by the fact that structure 28 is selectively openable (in any suitable manner). Expansion of airflow in chamber 28a to slow down airflow velocity, and to enlarge the cross-sectional area of that flow, immediately upstream from the filter aids by causing airflow to spread out across a broad filtration surface, thus to improve filtration effectiveness and operational filter lifetime. Gravity liquid trap and drain structure 30 discharges collected moisture/liquid downwardly through an appropriate drain structure (not shown) disposed on the underside of aircraft nose 10.

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As stated earlier herein, the system of this invention, and the clearly understandable methodology which it provides, effectively eliminate the serious catastrophic failure problem previously described herein. The system is quite simple in construction, and can be quite inexpensive in its installation and implementation. It can very easily be incorporated not only in new construction, but also as retrofit structure in an existing aircraft.

The methodology of the invention can be described as (a) intaking a flow of air at a location which is functionally upstream from an electrical generator in an aircraft, (b) filtering the thus intaken airflow to block the passage of entrained solids (particles), and (c) directing the filtered airflow in a close-coupled manner into the electrical sliding-contact zone of the electrical generator (or generators) in the aircraft, whereby that particle-and-grit-filtered flow, as a consequence of such close-coupling, provides substantially all of the ventilating air-flow which enters that zone. Where the word "aircraft" is employed herein, it should be understood to include other forms of vehicles wherein the problem addressed by the present invention may exist.

While a preferred and best mode embodiment of, and manner of practicing, the invention have thus been described and illustrated herein, it is appreciated that variations and modification may be made without departing from the spirit of the invention.